Predictors of adolescent smoking cessation and smoking reduction

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Abstract: OBJECTIVE: To investigate the processes of change, demographic, health- and smoking-related predictors of both smoking cessation and smoking reduction in adolescents. METHODS: Data were drawn from a sample of 755 adolescent smokers who participated in a study testing the efficacy of a text messaging-based intervention for smoking cessation. Demographic, health- and smoking-related variables were assessed at baseline. Five processes of smoking cessation, derived from the Transtheoretical Model and the Social Cognitive Theory, as well as outcome measures were assessed at 6-month follow up. Univariate and multivariate regression analyses were conducted to identify baseline and process variables to predict smoking abstinence and smoking reduction. RESULTS: Male gender (OR=0.43, p<.01), lower alcohol consumption (OR=0.90, p=.05) and a lower number of cigarettes smoked per day at baseline (OR=0.87, p<.01) predicted smoking abstinence. Baseline physical activity predicted smoking reduction (OR=1.04, p=.03). None of the examined process variables significantly predicted smoking abstinence. The process variable "counter-conditioning" predicted smoking reduction (OR=1.46, p=.03). CONCLUSIONS: Baseline predictors of smoking cessation differ from predictors of smoking reduction. Dynamic or modifiable variables play an important role in predicting adolescent smoking cessation. PRACTICE IMPLICATIONS: Counter-conditioning might be an important element in adolescent smoking cessation interventions.

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Predictors of adolescent smoking cessation and smoking reduction

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Abstract

Objective: To investigate processes of change, demographic, health- and smoking related predictors of both smoking cessation and smoking reduction in adolescents. *Methods*: Data were drawn from a sample of 755 adolescent smokers who participated in a study testing the efficacy of a text messaging-based intervention for smoking cessation. Demographic, health- and smoking related variables were assessed at baseline. Five processes of smoking cessation, derived from the Transtheoretical Model and the Social Cognitive Theory, as well as outcome measures were assessed at 6-month follow up. Univariate and multivariate regression analyses were conducted to identify baseline and process variables to predict smoking abstinence and smoking reduction. *Results*: Male gender (OR=0.43, $p<.01$), lower alcohol consumption (OR=0.90, $p=.05$) and a lower number of cigarettes smoked per day at baseline (OR=0.87, $p<.01$) predicted smoking abstinence. Baseline physical activity predicted smoking reduction (OR=1.04, $p=.03$). None of the examined process variables significantly predicted smoking abstinence. The process variable "counter-conditioning" predicted smoking reduction (OR=1.46, $p=.03$). *Conclusions*: Baseline predictors of smoking cessation differ from predictors of smoking reduction. Dynamic or modifiable variables play an important role in predicting adolescent smoking cessation. *Practice Implications*: Counter-conditioning might be an important element in adolescent smoking cessation interventions.

Keywords: smoking cessation, predictors, adolescents, young people

1. Introduction

Tobacco smoking in young people continues to be a serious problem. A survey of 15- and 16-year-old adolescents covering 36 European countries revealed that the smoking prevalence rate of 28% having used cigarettes during the past 30 days has remained stable over the last 4 years [1]. There is both limited evidence of smoking cessation interventions demonstrating efficacy in young people and little is known about which intervention elements are crucial for successful smoking cessation [2, 3]. The 2013 Cochrane Review for smoking cessation interventions for those younger than 20 years [3] identified 28 trials of sufficient quality, of which only 3 found statistically significant evidence of an intervention effect. The authors concluded that there is not yet sufficient evidence to recommend implementation of any one intervention model and that there continues to be a need for well-designed adequately powered randomized controlled trials.

Compared with adult smokers, adolescent smokers show lower levels of cigarette consumption and are more often occasional than daily smokers [4, 5]. Light and intermittent smoking compared to heavy smoking are under more stimulus control and often occur under the influence of alcohol and in social situations [6, 7]. Therefore, mechanisms of adolescent smoking cessation might differ from those of adults. The identification of psychosocial and smoking related predictors for adolescent smoking cessation might help to increase our understanding of smoking cessation in adolescents and to develop effective smoking cessation interventions for this relevant target group.

Recent studies which examined psychosocial predictors of smoking cessation in adolescents could not find a direct relation of parental and peer smoking on smoking abstinence, however parental and peer smoking were inversely related to smoking cessation through nicotine dependence [8-10]. Smoking-related variables that relatively consistently predicted adolescent cessation were nicotine dependence, e.g. a smaller number of cigarettes smoked [8, 11-13] lower alcohol consumption [13, 14] as well as smoking cessation self-efficacy [11, 12, 15]. Motivation for quitting or readiness to quit was found to be a significant predictor of smoking cessation in some studies [11, 16], however, a recent study that tested readiness to quit and nicotine dependence within one model revealed that only nicotine dependence remained significant [8].

Although various theoretical models, mainly the transtheoretical model [17], the theory of planned behavior [18] and the social cognitive theory [19], were applied for adolescent smoking cessation interventions, only few studies have addressed the relevance of the processes derived from these models. Kleinjan et al. [20] examined the relations between the processes of change derived from the transtheoretical model and stage transitions among adolescent smokers. Their results showed that out of the 10 examined processes only "counter-conditioning" was effective in changing adolescent smoking behavior.

The aims of this study were to investigate a comprehensive set of demographic, health- and smoking-related predictors of both smoking cessation and smoking reduction in adolescents. Furthermore, we tested whether the use of various processes of change derived from major theoretical models for adolescent smoking cessation predicted smoking cessation or reduction. The results of this study might increase our understanding of how specific intervention elements and participants` characteristics may influence adolescent smoking cessation.

2. Methods

2.1 Participants

The data for this study were collected within the randomized controlled trial "Efficacy of a text messaging (SMS)-based smoking cessation intervention for adolescents and young adults" (Trial registration: Current Controlled Trials ISRCTN19739792). The study was approved by the Local Ethics Committee of the Canton of Zurich, Switzerland and the Cantonal Office for Secondary Education in Zurich. The main results of this study as well as the study procedure are reported in detail elsewhere [21].

In Switzerland, vocational schools are typically post-secondary public schools and are analogous to American community colleges. They are part of the dual educational system that combines apprenticeships in a business-context and vocational training in a school-context. Vocational schools provide general education and specific skills for each particular profession.

Directors of vocational schools and contact teachers for addiction prevention from 57 vocational schools in the Swiss cantons of Zurich, Aargau, Basel, Zug and Schwyz were invited to participate

with some of their classes in a study testing the efficacy of a text messaging-based smoking cessation program. Of these schools, 24 vocational schools with a total of 177 school classes agreed to participate in the study. All students of the participating vocational school classes were invited by externally trained staff to participate in an anonymous online health survey during a regular school lesson reserved for health education. Participation was on a voluntary basis. The assessments were conducted between October 2011 and May 2012. At the time of the assessment, 2657 students were present in the school classes, of whom 2638 (99.3%) completed the assessment. Afterwards, the students were invited to complete an online screening. The survey included the assessment of demographic data, alcohol consumption, weekly physical activity, tobacco smoking status, number of smoking friends and ownership of a mobile phone. Using these data, daily or occasional smoking students who owned a mobile phone were invited to participate in a study testing the efficacy of a text messaging based smoking cessation intervention. After receiving informed consent online, the following smoking-related variables were assessed: stage of change, number of cigarettes smoked per day, past quit attempts, and age of smoking onset. From 1012 eligible persons, who met the inclusion criteria for study participation, a total of 755 persons (74.6%) participated in the study. Ninety classes consisting of 372 students were randomly assigned to the intervention group and 88 classes consisting of 383 students were assigned to the control group.

The fully-automated intervention program consisted of (1) an online assessment of individual smoking behavior and attitudes towards smoking cessation, (2) a weekly SMS-assessment of smoking-related target behaviors, and (3) two weekly feedback messages tailored to the data of the online and the SMS-assessments. Within the online assessment, participants of the intervention group received online questions assessing outcome expectancies of smoking cessation, situations or circumstances in which craving for cigarettes usually occurs and alternative strategies to handle these craving situations. During the 3-month intervention period, participants received one text message per week to assess smoking-related target behaviors. For all participants, the stage of change combining smoking status and intention to quit according to the Health Action Process Approach (HAPA) [22] was assessed in even weeks. In odd weeks, the number of cigarettes smoked per day or week in smokers in the preintentional stages was assessed. Smokers in the intention or action stage were asked whether they

applied individually chosen strategies to cope with craving situations assessed at baseline. The feedback messages were tailored to the HAPA stages and addressed: (1) the risks of smoking, (2) the monetary costs of smoking, (3) the social norms of smoking, (4) outcome expectancies, and (5) motivation to reduce the number of cigarettes smoked (6) social support for smoking cessation, (7) strategies to cope with craving situations, (8) tips for preparing for smoking cessation (9) reward for staying abstinent. On the second level, the feedback messages were tailored according to the individual information provided at the baseline assessment as well as through the weekly SMS assessments.

Control group participants were informed that they were assigned to the control group and could not participate in the SMS-program. Follow-up assessments were completed in 559 (74.0%) of the 755 study participants. The 7-day smoking abstinence rate at follow-up was 12.5% in the intervention group and 9.6% in the control group (ITT: p=.92). The mean number of cigarettes smoked per day at follow-up was lower in the intervention group than in the control group (ITT: p<.01). No differences between the study groups were observed in stage of change (ITT: p=.82) and quit attempts (ITT: p=.38).

2.2 Measures

2.2.1 Baseline measures

Demographic variables

The screening assessment included the following demographic variables: gender, age, school education and immigration background. Common Swiss levels of educational attainment were assessed: (1) none, (2) secondary school, (3) extended secondary school and (4) technical or high school. We assessed the country of birth of both parents of the students to identify a potential immigrant background. Based on this information, participants were assigned to one of the following categories: (1) neither parent born outside Switzerland, (2) one parent born outside Switzerland or (3) both parents born outside Switzerland.

Health-related variables

The following health-related variables were assessed: physical activity and alcohol use. Self-reported moderate to vigorous physical activity (VPA) was measured by a question derived from the Health Behaviour in School Aged Children (HBSC) study [23]: "Outside school: How many hours a week do you exercise or participate in sports that make you sweat or out of breath?" Alcohol consumption was assessed using the first three items of the Alcohol Use Disorder Identification Test AUDIT [24], the AUDIT-C [25]. The AUDIT–C assesses drinking quantity, drinking frequency and binge drinking. The number of smoking friends was assessed by the question "how many of your close friends are smoking cigarettes?" with the response options "none", "few", "some", "most" and "all".

Smoking-related variables

Tobacco smoking was assessed using the question, "Are you currently smoking cigarettes or did you smoke in the past?" with the following response options: (1) I smoke cigarettes daily; (2) I smoke cigarettes occasionally, but not daily; (3) I smoked cigarettes in the past, but I do not smoke anymore; and (4) I have never smoked cigarettes or have smoked less than 100 cigarettes in my life. In occasional smokers, we additionally assessed the number of days they typically smoked per month and the total number of cigarettes smoked within the previous 7 days. In daily smokers and occasional smokers who smoked at least 4 cigarettes in the preceding month and at least one cigarette during the preceding week, we additionally assessed the following smoking-related variables: mean number of cigarettes smoked per day, stage of change according to the HAPA [22], previous quit attempts and smoking cessation self-efficacy.

In daily smokers, we assessed the number of cigarettes smoked on a typical day. In occasional smokers, we initially assessed the typical number of smoking days per month; subsequently, the number of cigarettes smoked on a typical smoking day was assessed. For occasional smokers, the number of cigarettes smoked per day was computed by multiplying the typical number of smoking days per month by the number of cigarettes smoked on a typical smoking day divided by 30. The stage of change according to the HAPA was assessed by the following question: "Have you recently smoked cigarettes?" with the following response options (1) "Yes, and I do not intend to quit" (Precontemplation), (2) "Yes, but I am considering quitting" (Contemplation), (3) "Yes, but I seriously

intend to quit" (Preparation). Previous quit attempts were assessed by the question "Have you ever made a serious attempt to quit smoking?" with the response options "no", "yes – once" and "yes – more than once". Furthermore, we assessed age at smoking onset by the question: "How old were you when you started smoking periodically?" Smoking cessation self-efficacy was assessed by an item derived from the HAPA which refers to "action self-efficacy", i.e. one`s confidence in being capable of succeeding in smoking cessation [22]. The item assessed on a 5-point Likert scale ranging from 1 (not at all true) to 5 (exactly true) how certain a person was that he/she could quit smoking within the next month.

2.2.2 Follow-up measures

Computer-assisted telephone interviews were conducted at the six-month follow-up assessment by trained interviewers. For the current study, we used the following outcome variables: (1) smoking status, (2) 7-day smoking abstinence, (3) mean number of cigarettes smoked per day.

For assessment of smoking status, the participants could indicate whether they smoked (1) daily, (2) occasionally or (3) do not smoke anymore. Furthermore, 7-day point prevalence smoking abstinence, i.e., not having smoked a puff within the past seven days preceding the follow-up, was assessed. Among daily smokers, we assessed the number of cigarettes smoked on a typical day. Among occasional smokers, we initially assessed the typical number of smoking days per month and subsequently the number of cigarettes smoked on a typical smoking day. For occasional smokers, the number of cigarettes smoked per day was computed by multiplying the typical number of smoking days per month by the number of cigarettes smoked on a typical smoking day divided by 30. In participants who indicated that they did not smoke anymore, the value for the number of cigarettes smoked per day was set to zero. A reduction of cigarette use was defined as a decrease in the number of cigarettes smoked per day from baseline to follow-up assessment.

At follow-up, we additionally assessed processes of smoking cessation which were mainly derived from the Transtheoretical Model of Behavior Change [17] and the Social Cognitive Theory [19]: (1) social support/helping relationships, (2) outcome expectancies, (3) risk perception, (4) stimulus control and (5) coping with temptations/counter-conditioning. The use of these processes was assessed by the

following yes/no questions: “Within the last six months: did you...” (1) talk with others about smoking cessation, (2) reflect upon the pros of smoking cessation, (3) reflect upon the health risks of smoking, (4a) avoid places with frequent smoking, (4b) avoid smokers, (5) distract yourself from cigarette craving by other activities.

2.3 Data analysis

We initially performed separate logistic regression analyses (subsequently termed ‘‘univariate analyses’’) to evaluate the ability of each baseline and process variable to predict smoking abstinence and smoking reduction. The binary logistic regression models included the study condition and the examined predictor variable.

After examining the univariate predictors, multivariate prediction models were developed for each outcome and separately for the baseline variables and the process variables. Variable selection comprised the following steps: (1) significant predictors (p<.20) from the univariate analyses were entered into the preliminary multivariate model. (2) Variables not significant at p<.05 were removed one by one; variables with the highest p-values were removed first (backward selection). (3) To account for suppressor effects, the resulting model was verified by tentatively adding the aforementioned excluded variables separately to the regression model. Only variables significant at p < .05 were retained in the final model (forward selection).

To test whether the results differed according to gender or study group, we separately tested the moderating effect of these variables by adding the “gender x predictor variable” or the “study group x predictor variable” interaction term into the regression models, while controlling for the main effects of both study group and predictor variable. All analyses were performed using STATA, version 10. Given the clustered nature of the data (students within school classes) we computed robust variance estimators for all logistic regression models using the *svy* command of STATA. An alpha level of .05 (2-tailed) was chosen for the statistical tests.

3. Results

3.1 Sample characteristics

Baseline characteristics of the study sample are depicted in Table 1.

3.2 Baseline predictors of smoking abstinence

Table 2 presents univariate baseline predictors of 7-day smoking abstinence at follow-up. Smoking occasionally (OR=4.72, 95% CI: 2.59-8.62), a serious intention to quit (OR=3.65, 95% CI: 1.74-7.63), higher smoking cessation self-efficacy (OR=1.38, 95% CI: 1.14-1.67), lower alcohol consumption (OR=0.90, 95% CI: 0.81-0.99) and a lower number of cigarettes smoked per day (OR=0.87, 95% CI: 0.82-0.92) were positively associated with smoking abstinence at follow-up.

The final multivariate model predicting 7-day smoking abstinence revealed that female gender (OR=0.43, 95% CI: 0.25–.74), higher alcohol consumption (OR=0.90, 95% CI: 0.80–.1.00) and more cigarettes smoked per day at baseline (OR=0.87, 95% CI: 0.83–.92) were negatively associated with smoking abstinence at follow-up.

3.3 Baseline predictors of smoking reduction

Univariate baseline predictors of smoking reduction are presented in Table 2. Physical activity at baseline was the only significant predictor of smoking reduction and the only variable within the final multivariate model predicting smoking reduction (OR=1.04, 95% CI: 1.00-1.08).

3.4 Process variables predicting smoking abstinence

None of the examined process variables significantly predicted smoking abstinence (Table 3).

3.5 Process variables predicting smoking reduction

The processes “avoidance of places with frequent smoking” (OR=1.56, 95% CI: 1.02-2.39) and “distraction from cigarette craving by activity” (OR=1.46, 95% CI: 1.04-2.05) were positively associated with smoking reduction (Table 3). “Distraction from cigarette craving by other activities” was the only variable which remained in the final model (OR=1.46, 95% CI: 1.04-2.05).

3.6 Study group and gender as moderators

Gender moderated the association of educational attainment on 7-day smoking abstinence (OR=0.20, 95% CI: 0.04-0.97, *p*=.05). However, like for the total sample, separate analyses for males and females did not result in a significant association between educational attainment and smoking abstinence (males: OR= 1.48, 95% CI: 0.66-3.34, *p*=.34; females: OR=0.30, 95% CI: 0.08-1.15, *p*=.08). Gender did not moderate any of the other associations.

The study group moderated the association of smoking cessation self-efficacy on 7-day smoking abstinence (OR=1.57, 95% CI: 1.07-2.30, *p*=.02). A separate analysis for participants of the intervention group resulted in a significant association between self-efficacy and smoking abstinence (OR=1.70, 95% CI: 1.27-2.30, p=2.27, $p < .01$), whereas this association was not found in participants of the control group (OR=1.08, 95% CI: 0.84-1.40, *p*=.63). Study group did not moderate any of the other associations.

4. Discussion and conclusion

4.1 Discussion

This study examined baseline and process variables as predictors of both smoking cessation and smoking reduction in young people. The study revealed four main findings: (1) male gender as well as lower alcohol consumption and a lower number of cigarettes smoked per day at baseline were associated with higher smoking abstinence rates at follow-up. (2) Physical activity was the only baseline predictor of smoking reduction. (3) No process variables could be identified, which predicted smoking abstinence and (4) the process "distraction from cigarette craving by other activities" significantly predicted smoking reduction.

The baseline predictors of smoking cessation derived from our study are in line with previous research that shows that baseline nicotine dependence, e.g. the number of cigarettes smoked [8, 11-13] as well as alcohol consumption [13, 14] are important predictors of smoking abstinence. The result obtained from our final multivariate model that male gender predicted smoking abstinence could be explained by previous findings showing that gender differences in nicotine metabolism [26] as well as concerns about weight gain might deter more women from quitting than men [27].

Our results demonstrate that baseline predictors of smoking cessation differed from predictors of smoking reduction. This result is in contrast to the findings from Branstetter et al. [11] who obtained that reducers were similar to quitters with only a few exceptions. Their results showed that increased confidence, motivation and a higher stage of change were associated with decreased cigarette consumption, while our multivariate model revealed that baseline physical activity was the only predictor of smoking reduction. A recent meta-analysis showed that physical exercise acutely reduces cigarette craving in adult smokers [28]. Based on our results, physical exercise might also have an effect on cigarette craving in adolescent smokers; however, future controlled studies are needed to test this hypothesis.

Concerning the predictive utility of process variables for smoking cessation and reduction in adolescents, our results are in line with those obtained by Kleinjan et al. [8]. Their results showed that a greater engagement in counter-conditioning (replacing smoking with alternatives) was associated to smoking cessation one year later. However, our results did not reveal counter-conditioning, or as defined in our study "distraction from cigarette craving by other activities", as a significant predictor of smoking cessation but of smoking reduction.

Some limitations of the present study should be mentioned: First, smoking abstinence was not biochemically validated, however, studies among adolescents found self-reported smoking behavior to be reliable and valid [29, 30]. Second, the process variables were only assessed retrospectively at follow-up. Therefore, the responses might have been influenced by recall bias or by the information provided for the outcome measures. Multiple assessments over time might help to gain more insight into the longitudinal course and interdependence of process and outcome variables. Third, statistical power was low for some of the examined process variables, particularly those addressing aspects of stimulus control (avoidance of places with frequent smoking, avoidance of smokers) which resulted in relatively large confidence intervals. Fourth, the study was limited to students who had mobile phones, however only 9 (0.9%) of 1021 smokers who were assessed within the screening did not own a mobile phone. This percentage was similar to the 98% of the 12-to-19-year-old adolescents from Switzerland who owned a mobile phone in the year 2010 [31].

4.2 Conclusion

The study provides findings which increase our understanding of how specific intervention elements or processes as well as smokers` characteristics may influence adolescent smoking cessation and reduction.

4.3 Practice implications

Some implications for future adolescent smoking cessation interventions might be derived from our results: (1) Dynamic or modifiable variables play an important role in predicting adolescent smoking cessation. All univariate predictors of smoking cessation revealed in our study are modifiable by the individual smoker and/or could be triggered by interventions: intention to quit, smoking cessation self-efficacy, alcohol consumption and cigarette consumption. (2) Based on our results and on previous studies, showing positive associations between alcohol consumption and cigarette craving as well as risk of relapse [32-34], multi-behavior interventions addressing both cigarette smoking and alcohol consumption might be more effective than interventions focusing on smoking cessation only. (3) For adolescent smokers who do not intend to quit or for heavy smokers, a focus on reducing cigarette consumption by providing strategies for counter conditioning or distraction from cigarette craving by other activities might be reasonable and the resulting lower consumption in turn could increase the chance for following successful quit attempts. However, more studies are needed to examine the process how reduction in the number of smoked cigarettes leads to cessation or not.

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Table 1. Baseline characteristics of the study sample. Values are numbers unless stated otherwise.

All subjects	559
Demographics	
Male Gender	273 (48.8%)
Age, *M (SD)*	18.2 (2.3)
15-16 years	90 (16.1%)
17-18 years	290 (51.9%)
19-20 years	134 (24.0%)
21 years or older	45 (8.1%)
Educational attainment	
None	20 (3.6%)
Secondary school (9 years)	438 (78.4%)
Extended secondary school (10 or 11 years)	85 (15.2%)
Technical or high school	16 (2.9%)
Immigrant background	
No immigrant background	298 (53.3%)
One parent born outside Switzerland	110 (19.7%)
Both parents born outside Switzerland	151 (27.0%)
Health-related variables	
Alcohol consumption, AUDIT-C (scale 0-12),	5.4 (2.7)
Hours of extracurricular physical activity per week, *M (SD)*	3.8 (5.0)
Smoking-related variables	
Tobacco smoking status	
Current daily smokers	418 (74.8%)
Current occasional smokers	141 (25.2%)
Stage of change	
No intention to quit	156 (27.9%)
Considering quitting	303 (54.2%)

Serious intention to quit	100 (17.9%)
Number of cigarettes smoked per day, *M (SD)*	10.3 (7.7)
Age of onset of smoking, *M (SD)*	15.0 (1.6)
Previous quit attempts	
0	218 (39.0%)
1	243 (43.5%)
2 or more	98 (17.5%)
Smoking cessation self-efficacy, scale 1-5 (low-high), *M (SD)*	2.7 (1.4)
Friends smoking	
None or few	51 (9.1%)
Some	179 (32.0%)
Most	280 (50.1%)
All	49 (8.8%)

Table 2. Univariate baseline predictors of smoking abstinence and smoking reduction (n=559).

Baseline variable	Smoking abstinence		Smoking reduction	
	OR (95% CI)	*p*	*OR (95% CI)*	*p*
Demographics				
Male (Ref.)				
Female	0.63 (0.37-1.05)	.08	1.00 (0.71-1.42)	.99
Age in years	0.89 (0.77-1.02)	.09	1.05 (0.98-1.14)	.16
No educational attainment or secondary school (Ref.)				
Extended secondary, technical or high school	1.36 (0.80-2.31)	.38	0.96 (0.64-1.44)	.84
No immigration background (Ref.)				
One parent born outside Switzerland	1.05 (0.52-2.11)	.90	1.12 (0.68-1.83)	.66
Both parents born outside Switzerland	0.86 (0.42-1.75)	.67	1.15 (0.79-1.67)	.46
Health-related variables				
Alcohol consumption AUDIT-C, scale 0-12	0.90 (0.81-0.99)	.04	0.97 (0.91-1.03)	.32
Hours of extracurricular physical activity per week	0.99 (0.96-1.03)	.67	1.04 (1.00-1.08)	.03
Smoking-related variables				
Current daily smoker (Ref.)				
Current occasional smoker	4.72 (2.59-8.62)	.00	1.18 (0.81-1.73)	.38
No intention to quit (Ref.)				
Considering quitting	1.37 (0.69-2.73)	.37	0.77 (0.50-1.19)	.24
Serious intention to quit	3.65 (1.74-7.63)	.00	1.04 (0.60-1.82)	.88
Number of cigarettes smoked per day, *M (SD)*	0.87 (0.82-0.92)	.00	1.00 (0.98-1.03)	.74
Age of onset of smoking, *M (SD)*	1.11 (0.95-1.30)	.20	1.00 (0.90-1.12)	.95
No previous quit attempts (Ref.)				
One or more previous quit attempts	0.56 (0.32-1.00)	.05	1.09 (0.75-1.59)	.66
Smoking cessation self-efficacy, scale 1-5 (low-high)	1.38 (1.14-1.67)	.00	1.13 (1.00-1.29)	.05
None, few or some friends smoking (Ref.)				
Most or all friends smoking	0.69 (0.40-1.18)	.17	0.88 (0.62-1.24)	.46

Notes: Separate binary logistic regression model for each baseline variable. Models included the examined predictor as well as the study condition. AUDIT-C = short form of the Alcohol Use Disorders Identification Test; higher values represent higher alcohol consumption.

Table 3. Process variables as predictors of smoking abstinence and smoking reduction (n=555).

Process variable	Number of persons applying the process (%)	Smoking abstinence		Smoking reduction	
		OR (95% CI)	*p*	*OR (95% CI)*	*p*
Talking with others about smoking cessation	394 (71.0%)	0.75 (0.44-1.26)	.27	0.96 (0.69-1.34)	.83
Reflecting upon the pros of smoking cessation	427 (76.9%)	0.67 (0.37-1.21)	.19	0.94 (0.64-1.40)	.77
Reflecting upon the health risks of smoking	436 (78.6%)	1.27 (0.63-2.53)	.50	1.21 (0.83-1.78)	.32
Avoidance of places with frequent smoking	108 (19.5%)	1.26 (0.66-2.41)	.48	1.56 (1.02-2.39)	.04
Avoidance of smokers	39 (7.0%)	1.81 (0.67-4.92)	.24	1.88 (0.89-3.98)	.10
Distraction from cigarette craving by other activities	293 (52.8%)	0.98 (0.58-1.65)	.94	1.46 (1.04-2.05)	.03

Notes: Separate binary logistic regression model for each process variable. Models included the examined process variable as well as the study condition.